CLAIMS

1. A process for producing a high-resolution surface pattern (41, 51, 93, 95, 98) on a substrate (40, 27, 50, 90), wherein in the process a printing substance (44, 26, 2) is applied to the substrate (40, 27, 50, 90), in pattern form by means of a printing process, characterised in that for fine structuring of the surface pattern (41, 51, 93, 95, 98) prior to the application of the printing substance a microscopic surface structure (24, 45, 52, 53, 54, 61 to 65, 71, 72, 81, 82) with a plurality of grooves is replicated in the surface of the substrate and that the fine structuring of the surface pattern (41, 51, 93, 95, 98) is determined by the respective locally applied application amount of printing substance (44, 26) and the respective local relief parameters of the microscopic surface structure (45, 24, 52 to 54, 63 to 64, 71, 72, 81, 82), in particular orientation direction and profile shape.

2. A process according to claim 1 characterised in that the fine structuring of the surface pattern (41, 51, 93, 95, 98) is implemented by variations in the orientation direction of the grooves of the microscopic surface structure (24, 45, 52, 53, 54).

3. A process according to one of the preceding claims characterised in that the fine structuring of the surface pattern (93, 95, 98) is implemented by variations in the profile depth of the grooves of the microscopic surface structure (61 to 65).

4. A process according to one of the preceding claims characterised in that the fine structuring of the surface pattern (93, 95, 98) is implemented by variations in the profile shape of the grooves of the microscopic surface structure (71, 72, 81, 82).

5. A process according to one of the preceding claims characterised in that the width of a surface region of the surface pattern (41, 51) is

determined by the choice of the angle between the longitudinal axis of the surface region and the orientation direction of the associated portion of the microscopic surface structure (45).

6. A process according to one of the preceding claims characterised in that the width of a surface region of the surface pattern (51) is varied by the provision, in the surface region, of regions (52, 53) with a different orientation direction for the surface structure.

7. A process according to claim 6 characterised in that the width of the surface region of the surface pattern (51) is varied by the provision, in the surface region, of at least two regions (52, 53) with the orientation directions of the surface structure being rotated relative to each other through 90 degrees.

8. A process according to one of the preceding claims characterised in that the width of the surface region of the surface pattern (51) is varied by the provision, in the surface region, of regions with a different profile shape and/or profile depth of the surface structure.

9. A process according to one of the preceding claims characterised in that the centering of a surface region of the surface pattern (95, 98) is altered by an asymmetrical profile shape in the associated portion of the microscopic surface structure.

10. A process according to one of claims 5 to 9 characterised in that the width of the surface region is less than 50 μm.

11. A process according to one of the preceding claims characterised in that moiré patterns (101, 102, 103, 104, 105) are produced by means of the fine structuring of adjacent surface regions by a variation in local relief parameters of the microscopic surface structure.

12. A process according to one of the preceding claims characterised in that a micro-script pattern is produced by means of the fine structuring by a variation in local relief parameters of the microscopic surface structure.

13. A process according to one of the preceding claims characterised in that a region in which the thickness of the printing substance layer (133, 134) varies in a pre-defined manner is produced by varying the profile depth of the grooves of the microscopic surface structure (131, 132).

14. A process according to claim 13 characterised in that a high-refractive lacquer is used as the printing substance and that a lens body is produced by the variation in the profile depth of the grooves in the region.

15. A process according to one of the preceding claims characterised in that the fine structuring of the surface pattern is implemented by a variation in the relief parameters of the microscopic surface structure with a substantially constant application amount of printing substance per unit of surface area.

16. A process according to one of the preceding claims characterised in that the microscopic surface structure has a spatial frequency of more than 50 groves/mm, preferably from 100 to 1200 grooves/mm, and a profile depth of less than 2 μm, preferably from 0.2 to 1.0 μm.

17. A multi-layer body (28) having a substrate layer (25) and a pattern layer (26), which is arranged on the substrate layer and which is shaped on the substrate layer in pattern form in the form of a high-resolution surface pattern, wherein the pattern layer (26) comprises a printing substance which is applied in pattern form to the substrate layer by means of a printing process, characterised in that a microscopic surface structure (24) with a plurality of grooves is replicated into the surface of the substrate layer for fine structuring of the surface pattern prior to

application of the printing substance wherein the fine structuring of the surface pattern is determined by the respective locally applied application amount of printing substance and respective local relief parameters of the microscopic surface structure, in particular orientation direction and profile shape.

18. A multi-layer body according to claim 17 characterised in that the multi-layer body is a film, in particular a hot stamping film or a laminating film.

19. A multi-layer body according to one of claims 17 and 18 characterised in that the printing substance is an etch resist.

20. A multi-layer body according to one of claims 17 and 18 characterised in that the printing substance is an etching agent.

21. A multi-layer body according to one of claims 17 and 18 characterised in that the printing substance contains an organic semiconductor material.

22. An apparatus for producing a high-resolution surface pattern on a substrate, wherein the apparatus has a printing station (36) for applying a printing substance to the substrate in pattern form, characterised in that the apparatus has a replication station (35) arranged upstream of the printing station (36) for fine structuring of the surface pattern, which is so adapted that it replicates into the surface of the substrate a microscopic surface structure having a plurality of grooves, and that the printing station (36) is further so adapted that it applies the printing substance to the microscopic surface structure of the substrate in such a way that a predetermined fine structuring of the surface pattern is afforded by the respective locally applied application amount of printing substance and the respective local relief parameters of the microscopic surface structure, in particular orientation direction and profile shape.

23. Apparatus according to claim 22 characterised in that the printing station (36) has a device for application of the printing substance in accurate register relationship.

24. Apparatus according to claim 22 characterised in that the apparatus has a central cylinder (34) at which the replication station (35) and the printing station (36) are arranged.